

Claims

1. An injection device for the administering of one or more injections from an injection cartridge which is arranged in a holder device and at its rear end is provided with a piston which by means of a piston rod may be displaced forwards, and wherein the readying of the device for the administering after the positioning of said cartridge, and the subsequent administering therefrom are controlled by an electronic control unit, **characterized** in that said control unit comprises a position sensor which emits signals which govern the control unit in such a way that during the readying of the device, forward movement of the piston rod is made possible only when the longitudinal axis of the injection cartridge is oriented in a predetermined direction.
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- 15 2. An injection device according to claim 1, **characterized** in that the movement of the piston rod is effected by means of an electric motor, which is controlled by said control unit.
- 20 3. An injection device according to claim 1 or 2, **characterized** in that said readying of the device comprises the removal of gas from said injection cartridge.
- 25 4. An injection device according to any one of claims 1-3, **characterized** in that said cartridge is a multi-chamber cartridge and in that said readying also comprises a reconstitution of an injectable composition.
- 30 5. An injection device according to claim 4, **characterized** in that said readying of the device is possible only with the longitudinal axis of the cartridge in an essentially vertical orientation with its front end, from which the administering is to take place, pointing upward.
- 35 6. An injection device according to claim 4, **characterized** in that said readying of the device is possible only with the longitudinal axis of the injection cartridge in an essentially vertical orientation, with the front end of the cartridge pointing downwards.

7. A portable or hand-held injection device comprising a container for a preparation, or components for a preparation, an outlet for the preparation and displacing means at least able to displace the preparation through the outlet, **characterized** in that the device further comprises a position sensor 5 designed to emit one or more position signals indicative of its orientation and a control unit designed to receive the position signals and issue one or more operation signals for the device, the operation signals being one or more messages and/or one or more control signals for the displacing means.

10 8. The device of claim 7, **characterized** in that the container may contain gas and that the operation signals are designed to prevent displacing means activation when device orientation is in first predetermined positions unsuitable for deaeration and to allow displacing means activation when device orientation is in second predetermined positions suitable for deaeration. 15

15 9. The device of claim 7, **characterized** in that the container comprises at least two compartments for components of the preparation, that the displacing means are operative to mix contents of at least two compartments and that the operation signals are designed to prevent displacing means activation 20 when device orientation is in first predetermined positions unsuitable for mixing and to allow displacing means activation when device orientation is in second predetermined positions suitable for mixing.

25 10. The device of claim 9, **characterized** in that the container is a dual or multi-chamber cartridge with at least one movable piston separating the compartments and a by-pass section for overflow of compartment content past the piston.

30 11. The device of claim 10, **characterized** in that the orientation suitable for mixing is with the outlet pointing upwards, preferably substantially vertical.

12. The device of claim 7, **characterized** in that the control unit is designed to register a change in position sensor signals. 35

13. The device of claim 12, **characterized** in that the operation signals are designed to prevent displacing means activation for ejection of preparation

through the outlet unless the device has been turned in a predetermined manner.

14. The device of claim 12, characterized in that the operation signals are
5 designed to prevent repeated displacing means activation for ejection of preparation through the outlet unless the device has been turned in a predetermined manner between the repeated displacement means activations.

10 15. The device of claim 7, characterized in that the operation signals are designed to prevent displacing means activation for ejection of preparation through the outlet when device orientation is in first predetermined positions unsuitable for administration and to allow displacing means activation for ejection of preparation through the outlet when device orientation is in second predetermined positions suitable for administration.
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16. The device of any one of claims 7 to 14, characterized in that the one or more operation signals are one or more messages and/or one or more control signals for the displacing means.

20 17. The device of claim 16, characterized in that the messages are one or more alarms or instructions detectable by an operator, for guidance of the operator to the actions stated.

25 18. The device of any one of claims 16, characterized in that the displacing means are activated by actuating means and that the one or more operation signals are one or more control signals for the actuating means.

30 19. The device of claim 18, characterized in that the actuating means comprises electric motor means for the displacement means.

35 20. The device of claim 16, characterized in that the displacing means incorporates arming means, valve means or fluid control means and that the one or more operation signals are one or more control signals for said means.